LISTING OF CLAIMS

1 through 42. (cancelled)

43. (currently amended) An objective comprising:

a focusing lens group comprising at least one focusing lens, each focusing lens having diameter less than approximately 100 millimeters, the focusing lens group configured to receive light energy and transmitting focused light energy;

a field lens group comprising at least one field lens, each field lens having diameter less than approximately 100 millimeters and configured to receive said focused light energy and transmit intermediate light energy; and

a Mangin mirror group comprising at least one Mangin mirror element having a flat surface, each Mangin mirror element having diameter less than 100 millimeters and configured to receive said intermediate light energy and provide controlled light energy through an immersion substance to a specimen, said Mangin mirror group positioned between the field lens group and the specimen, wherein the flat surface of at least one Mangin mirror element is proximate the immersion substance and at least one Mangin mirror element in the Mangin mirror group comprises two reflective surfaces;

wherein each focusing lens and each field lens is formed from a single glass material, and further wherein every component of said Mangin mirror group, said field lens group and said focusing lens group is aligned along a received light energy axis ~~and the Mangin mirror group~~, and further wherein the two reflective surfaces of the at least one Mangin mirror element in the Mangin mirror group are mirrored surfaces separated by a nonzero distance along the received light energy axis.

44. (previously presented) The objective of claim 43, wherein said objective has a field size of approximately 0.15mm.

45. (previously presented) The objective of claim 43, configured to have a numerical aperture of approximately 1.2.

46. (previously presented) The objective of claim 43, wherein each lens used in the objective has a diameter of less than approximately 25 millimeters.

47. (previously presented) The objective of claim 43, said objective used with a microscope having a flange, wherein the flange may be located at least approximately 45 millimeters from the specimen during normal operation.

48. (previously presented) The objective of claim 47, wherein the flange may be located at least approximately 100 millimeters from the specimen during normal operation.

49. (previously presented) The objective of claim 43, further comprising at least one additional lens constructed from a second glass material.

50. (previously presented) The objective of claim 43, wherein the immersion substance is water.

51. (previously presented) The objective of claim 43, wherein the immersion substance is oil.

52. (previously presented) The objective of claim 43, wherein the immersion substance is silicone gel.

53. (previously presented) The objective of claim 43, wherein the objective is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations.

54. (previously presented) The objective of claim 43, wherein the at least one mangin mirror element is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced by the focusing lens group.

55. (currently amended) An objective comprising:

a focusing lens group comprising at least one focusing lens, each focusing lens having diameter less than approximately 100 millimeters, said focusing lens group configured to receive light energy and transmit focused light energy;

a field lens group comprising at least one field lens, each field lens having diameter less than approximately 100 millimeters~~,~~ said field lens group configured to receive said focused light energy and transmit intermediate light energy; and

a Mangin mirror group comprising at least one Mangin mirror element having a flat surface, each Mangin mirror element having diameter less than 100 millimeters, said Mangin mirror group configured to receive said intermediate light energy and provide controlled light energy through an immersion substance to a specimen, said Mangin mirror group positioned between the field lens group and the specimen and said Mangin mirror element flat surface contacting the immersion substance and at least one Mangin mirror element in the Mangin mirror group comprises two reflective surfaces;

wherein said objective is configured to provide imaging while receiving light energy at wavelengths less than 400 nm and further wherein every component of said Mangin mirror group, said field lens group, and said focusing lens group is aligned along a single received light energy axis and further wherein the two reflective surfaces of the at least one Mangin mirror element in the Mangin mirror group are mirrored surfaces separated by a nonzero distance along the received light energy axis.

56. (previously presented) The objective of claim 55, wherein said objective has a field size of approximately 0.15mm.

57. (previously presented) The objective of claim 55, wherein said Mangin mirror group comprises:

a single lens/mirror element comprising:

a substantially curved concave surface; and

a second minimally curved surface;

wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass.

58. (previously presented) The objective of claim 55, said objective having a numerical aperture of greater than approximately 1.0 at the specimen.

59. (previously presented) The objective of claim 55, wherein each lens in the objective has a diameter of less than approximately 25 millimeters.

60. (previously presented) The objective of claim 55, said objective having an ability to be employed with a microscope having a flange, wherein the flange may be located less than no more than approximately 45 millimeters from the specimen during normal operation.

61. (previously presented) The objective of claim 55, wherein the lenses of the objective are constructed of no more than two glass materials.

62. (previously presented) The objective of claim 61, wherein the no more than two glass materials comprise fused silica and calcium fluoride.

63. (previously presented) The objective of claim 55, wherein the immersion substance comprises one from a group comprising water, oil, and silicone gel.

64. (previously presented) The objective of claim 55, configured to have a numerical aperture of approximately 1.2.

65. (currently amended) A method for inspecting a specimen, comprising:

providing light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range;

focusing said light energy using a focusing lens group comprising at least one lens into focused light energy, where each lens in said focusing lens group has diameter less than approximately 100 millimeters;

receiving said focused light energy and converting said focused light energy into intermediate light energy using a field lens group; and

receiving said intermediate light energy through a Mangin mirror group and providing controlled light energy from the Mangin mirror group through an immersion substance to a specimen, said Mangin mirror group comprising one element having a flat surface positioned adjacent the immersion substance, said Mangin mirror group positioned between the field lens group and the specimen, wherein at least one element in the Mangin mirror group comprises two reflective surfaces;

wherein every component of said Mangin mirror group, field lens group, and focusing lens group is aligned along a single received light energy axis and further wherein the two reflective surfaces of the at least one element in the Mangin mirror group are mirrored surfaces separated by a nonzero distance along the received light energy axis.

66. (previously presented) The method of claim 65, wherein said method results in a field size of approximately 0.15mm.

67. (previously presented) The method of claim 66, wherein said providing, focusing, focused light energy receiving, and intermediate light energy receiving results in a field size of approximately 0.15mm.

68. (previously presented) The method of claim 66, providing, focusing, focused light energy receiving, and intermediate light energy receiving results in a numerical aperture of approximately 1.2.

69. (previously presented) The method of claim 66, wherein each lens used has a diameter of less than approximately 25 millimeters.

70. (previously presented) The method of claim 66, said method employed with a microscope having a flange, wherein the flange may be located at least approximately 45 millimeters from the specimen during normal operation.

71. (previously presented) The method of claim 70, wherein the flange may be located at least approximately 100 millimeters from the specimen during normal operation.

72. (previously presented) The method of claim 66, wherein only two glass materials are used for lenses.

73. (previously presented) The method of claim 66, wherein the immersion substance is water.

74. (previously presented) The method of claim 66, wherein the immersion substance is oil.

75. (previously presented) The method of claim 66, wherein the immersion substance is silicone gel.

76. (previously presented) The method of claim 66, wherein providing, focusing, focused light energy receiving, and intermediate light energy receiving is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations.

77. (previously presented) The method of claim 66, wherein the providing, focusing, focused light energy receiving, and intermediate light energy receiving is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced.

78. (currently amended) An objective comprising:

a focusing lens group comprising at least one focusing lens receiving light energy and transmitting focused light energy;

a field lens group comprising at least one field lens receiving said focused light energy and transmitting intermediate light energy; and

a Mangin mirror group comprising at least one Mangin mirror element having diameter less than 100 millimeters receiving said intermediate light energy and providing controlled light energy through an immersion substance to a specimen, said Mangin mirror group positioned between the field lens group and the specimen, and at least one Mangin mirror element having a flat surface positioned adjacent the immersion substance and at least one Mangin mirror element in the Mangin mirror group comprises two reflective surfaces;

wherein all components of said Mangin mirror group, the field lens group, and the focusing lens group aligned along a single received light energy axis and further wherein the two reflective surfaces of the at least one Mangin mirror element in the Mangin mirror group are mirrored surfaces separated by a nonzero distance along the received light energy axis.

79. (previously presented) The objective of claim 78, wherein said objective has a field size of approximately 0.15mm.

80. (previously presented) The objective of claim 78, configured to have a numerical aperture of approximately 1.2.

81. (previously presented) The objective of claim 78, wherein each lens used in the objective has a diameter of less than approximately 25 millimeters.

82. (previously presented) The objective of claim 78, said objective used with a microscope having a flange, wherein the flange may be located at least approximately 45 millimeters from the specimen during normal operation.

83. (previously presented) The objective of claim 82, wherein the flange may be located at least approximately 100 millimeters from the specimen during normal operation.

84. (previously presented) The objective of claim 78, wherein only two glass materials are used.

85. (previously presented) The objective of claim 78, wherein the immersion substance is water.

86. (previously presented) The objective of claim 78, wherein the immersion substance is oil.

87. (previously presented) The objective of claim 78, wherein the immersion substance is silicone gel.

88. (previously presented) The objective of claim 78, wherein the objective is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations.

89. (previously presented) The objective of claim 78, wherein the at least one mangin mirror element is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced by the focusing lens group.

90. (currently amended) An objective comprising:

a focusing lens group comprising at least one focusing lens receiving said light energy and transmitting focused light energy;

a field lens group comprising at least one field lens receiving said focused light energy and transmitting intermediate light energy; and

a Mangin mirror group comprising at least one Mangin mirror element having diameter less than 100 millimeters, said Mangin mirror group receiving said intermediate light energy and providing controlled light energy through an immersion substance to a specimen, said Mangin mirror group positioned between the field lens group and the specimen, wherein at least one Mangin mirror element comprises a flat surface oriented proximate the immersion substance, and at least one Mangin mirror element in the Mangin mirror group comprises two reflective surfaces;

wherein said Mangin mirror group, said focusing lens group, and said field lens group are aligned along a single received light energy axis and further wherein the two reflective surfaces of the at least one Mangin mirror element in the Mangin mirror group are mirrored surfaces separated by a nonzero distance along the received light energy axis.

91. (previously presented) The objective of claim 90, wherein said objective has a field size of approximately 0.15mm.

92. (previously presented) The objective of claim 90, wherein the Mangin mirror group comprises:

a single lens/mirror element comprising:

a substantially curved concave surface; and

a second minimally curved surface;

wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass.

93. (previously presented) The objective of claim 90, said objective having a numerical aperture of greater than approximately 1.0 at the specimen.

94. (previously presented) The objective of claim 90, wherein each lens in the objective has a diameter of less than approximately 25 millimeters.

95. (previously presented) The objective of claim 90, said objective having an ability to be employed with a microscope having a flange, wherein the flange may be located less than no more than approximately 45 millimeters from the specimen during normal operation.

96. (previously presented) The objective of claim 90, said objective employing no more than two glass materials.

97. (previously presented) The objective of claim 96, wherein the no more than two glass materials comprise fused silica and calcium fluoride.

98. (previously presented) The objective of claim 90, wherein the immersion substance comprises one from a group comprising water, oil, and silicone gel.

99. (previously presented) The objective of claim 90, configured to have a numerical aperture of approximately 1.2.